CLAIM AMENDMENTS

Claim 1 (previously presented). An identification for a batched product comprising a mathematical array of concentrations of isotopes, said concentrations of isotopes being the result of an analysis of a plurality of the naturally occurring stable isotopes of said product, said mathematical array being presented in a readable form.

Claim 2 (previously presented). The isotopic identification of Claim 1 wherein said concentrations of isotopes are chosen from the group of isotopic concentrations consisting of concentrations of isotopes, concentrations of isotopes and their errors, ratios of isotope concentrations, ratios of isotope concentrations and their errors and combinations thereof.

Claim 3 (previously presented). The isotopic identification of Claim 1 wherein said readable form is chosen from the group of readable forms consisting of serial numbers, bar codes, and other numerical and alphabetical indicia.

Claim 4 (original). The isotopic identification of Claim 1 wherein said mathematical array is chosen from the group of mathematical arrays consisting of a list of a plurality of concentrations, a list of a plurality of isotopic ratios, a list of a plurality of mathematical products of isotopic concentrations, a list of a plurality of mathematical products of isotopic ratios, groups of any such lists, groups of any such mathematical products, groups of any such ratios, groups of any such concentrations, mathematical products of any such concentrations plus or minus their error added, mathematical products of any such ratios plus or minus their error added, any such concentrations, ratios, lists, groups, and mathematical products in quadrature, isotopic ratios of any such mathematical products, ratios of said concentrations plus or minus their errors added, any of such

concentrations plus or minus their errors added, factor analysis of any such concentrations, ratios, lists, groups, mathematical products and any determinants and combinations thereof.

Claim 5 (previously presented). The isotopic identification of Claim 1 wherein the isotopes available are any of the 224 existing stable isotopes of known elements that have two or more isotopes.

Claim 6 (previously presented). The isotopic identification of Claim 1 wherein said isotopes are of any of the 13 stable isotopes of the group of elements consisting of carbon, hydrogen, oxygen, nitrogen, sulfur and combinations thereof.

Claim 7 (previously presented). The isotopic identification of Claim 1 wherein the error of the identification is chosen by the mathematical array chosen, the number of concentrations of isotopes utilized in said array, and the portion of said array compared with the isotopic analysis of said unknown product.

Claim 8 (previously presented). The isotopic identification of Claim 1 wherein the batched product from which the concentrations of isotopes are analyzed and formed into a mathematical array is chosen from the group of batched products consisting of active pharmaceutical ingredients, excipients of drug products, impurities in drug products, raw materials and drug products, combustible fuels, additives to combustible fuels, environmental and naturally occurring products, explosives products, ammunition, gun powder, crude oil, petroleum distillates, hazardous waste, paper, ink, tire materials, paints and other coatings, and other synthetic materials.

Claim 9 (original). The isotopic identification of Claim 1 wherein said concentrations of isotopes are chosen from the group of concentrations of isotopes consisting of bulk phase analysis and specific compound analysis.

Claim 10 (previously presented). The isotopic identification of Claim 9 wherein said bulk phase analysis includes off-line dual inlet isotope ratio mass spectrometry (irMS) and on-line combustion coupled with high resolution isotope ratio monitoring/mass spectrometry (irmMS).

Claim 11 (original). The isotopic identification of Claim 9 wherein specific compound analysis includes gas chromatography coupled with irMS (irmGCMS) and liquid chromatography coupled with irMS (irmLCMS).

Claim 12 (original). The isotopic identification of Claim 1 wherein said analyses includes nuclear magnetic resonance.

Claim 13 (previously presented). The isotopic identification of Claim 1 wherein said readable form is a machine readable form that is comparable to other machine readable forms derived from the analysis of known products and their product information stored in memory on a machine together with an index, said machine readable forms, index, and product information being interlinked, said machine readable forms once identified through the index presents stored product information in displayed form.

Claim 14 (original). The isotopic identification of Claim 13 wherein said product information may be scrolled through.

Claim 15 (original). The isotopic identification of Claim 13 wherein said product information may be printed.

Claim 16 (original). The isotopic identification of Claim 13 wherein said product information may be accessed through said index from said machine readable form of said mathematical array.

Claim 17 (previously presented). The method of objectively identifying batched products comprising the steps of analyzing a batched product for the concentration of a plurality of the naturally occurring stable isotopes of said product, arranging said concentrations of said isotopes into a mathematical array, formulating said mathematical array into a readable form, assembling product information, indexing said product information and said readable form thereby forming an index, and maintaining said index and said product information.

Claim 18 (previously presented). The method of Claim 17 further comprising the step of measuring the concentration of one or more of said isotopes in a comparable substance and comparing the concentration of said one or more isotopes of said comparable substance with the concentrations of said mathematical array in readable form to identify said substance.

Claim 19 (canceled without prejudice to Applicant).

Claim 20 (previously presented). The method of Claim 17 wherein said concentrations of isotopes are chosen from the group of isotopic concentrations consisting of concentrations of isotopes, concentrations of isotopes and their errors, and ratios of isotope concentrations, ratios of isotope concentrations and their errors and combinations thereof.

Claim 21 (previously presented). The method of Claim 17 wherein said readable form is a machine readable form of said mathematical array, said product information is placed on a machine, said machine readable form being indexed to said product information.

Claim 22 (previously presented). The method of Claim 21 wherein said product information may be displayed by identifying said machine readable form and indexing the same to said product information.

Claim 23 (previously presented). The method of Claim 22 wherein said product information may be scrolled and/or downloaded or printed as desired.

Claim 24 (previously presented). The method of Claim 21 further comprising measuring the concentration of said plurality of isotopes in a comparable substance, arranging said comparable substance concentrations into a mathematical array, and comparing the mathematical array of said comparable substance with said mathematical array of said product.

Claim 25 (previously presented). The method of Claim 24 wherein said mathematical array includes ratios and concentrations and said comparing step comprises comparing each of said ratios and concentrations step by step to identify said comparable substance within the error desired.

Claim 26 (previously presented). The method of Claim 24 wherein said concentrations of isotopes are chosen from the group of isotopic concentrations consisting of concentrations of isotopes, concentrations of isotopes and their errors, and ratios of isotope concentrations, ratios of isotope concentrations and their errors and combinations thereof.

Claim 27 (previously presented). The method of Claim 24 wherein said readable form is chosen from the group of readable forms consisting of serial numbers, bar codes, and other numerical and alphabetical indicia.

Claim 28 (previously presented). The method of Claim 24 wherein said mathematical array

is chosen from the group of mathematical arrays consisting of a list of a plurality of concentrations, a list of a plurality of isotopic ratios, a list of a plurality of mathematical products of isotopic concentrations, a list of a plurality of mathematical products of isotopic ratios, groups of any such lists, groups of any such mathematical products, groups of any such ratios, groups of any such concentrations, mathematical products of any such concentrations plus or minus their error added, mathematical products of any such ratios plus or minus their error added, any such concentrations, ratios, lists, groups, and mathematical products in quadrature, isotopic ratios of any such mathematical products, ratios of said concentrations plus or minus their errors added, any of such concentrations plus or minus their errors added, factor analysis of any such concentrations, ratios, lists, groups, mathematical products and any determinants and combinations thereof.

Claim 29 (previously presented). The method of Claim 24 wherein the isotopes available are any of the 224 existing stable isotopes of known elements that have two or more isotopes.

Claim 30 (previously presented). The method of Claim 24 wherein said isotopes are of any of the 13 stable isotopes of the group of elements consisting of carbon, hydrogen, oxygen, nitrogen, sulfur and combinations thereof.

Claim 31 (previously presented). The method of Claim 24 wherein the error of identification is chosen by the mathematical array chosen, the number of concentrations of isotopes utilized in said array, and the portion of said array compared with the isotopic analysis of said unknown product.

Claim 32 (previously presented). The method of Claim 24 wherein the batched product from which the concentrations of isotopes are analyzed and formed into a mathematical array is

chosen from the group of batched products consisting of active pharmaceutical ingredients, excipients of drug products, impurities in drug products, raw materials and drug products, combustible fuels, additives to combustible fuels, environmental and naturally occurring products, explosives and ammunition, gun powder, crude oil, petroleum distillates, hazardous waste, paper, ink, tire materials, paints and other coatings, and other synthetic materials.

Claim 33 (previously presented). The method of Claim 24 wherein said concentrations of isotopes are chosen from the group of concentrations of isotopes consisting of bulk phase analysis and specific compound analysis.

Claim 34 (previously presented). The method of Claim 33 wherein said bulk phase analysis includes off-line dual inlet isotope ratio mass spectrometry (irMS) and on-line combustion coupled with high resolution isotope ratio monitoring/mass spectrometry (irmMS).

Claim 35 (previously presented). The method of Claim 33 wherein said specific compound analysis includes gas chromatography coupled with irMS (irmGCMS) and liquid chromatography coupled with irMS (irmLCMS).

Claim 36 (previously presented). The method of Claim 24 wherein said analyses includes nuclear magnetic resonance.

Claim 37 (previously presented). The method of Claim 24 wherein said readable form is a machine readable form and said product information is stored in memory on a machine together with the index, said machine readable form, index and product information being interlinked, said machine readable form once identified through the index presents stored product information in displayed form.

Claim 38 (previously presented). The method of Claim 37 wherein said product information may be scrolled through.

Claim 39 (previously presented). The method of Claim 37 wherein said product information may be printed.

Claim 40 (previously presented). The method of Claim 37 wherein said product information may be accessed through said index from said machine readable form of said mathematical array.

Claim 41 (previously presented). The method of Claim 17 wherein said mathematical array is chosen from the group of mathematical arrays consisting of a list of a plurality of concentrations, a list of a plurality of isotopic ratios, a list of a plurality of mathematical products of isotopic concentrations, a list of a plurality of mathematical products of isotopic ratios, groups of any such lists, groups of any such mathematical products, groups of any such ratios, groups of any such concentrations, mathematical products of any such concentrations plus or minus their error added, mathematical products of any such ratios plus or minus their error added, any such concentrations, ratios, lists, groups, and mathematical products in quadrature, isotopic ratios of any such mathematical products, ratios of said concentrations plus or minus their errors added, any of such concentrations plus or minus their errors added, factor analysis of any such concentrations, ratios, lists, groups, mathematical products and any determinants and combinations thereof.

Claim 42 (previously presented). An identification for a composition comprising an arrangement of empirical information derived from an analysis of a plurality of naturally occurring

stable isotopes of at least one of the chemical elements in said composition, said arrangement comprising a numerical array of said empirical information in a readable form.

Claim 43 (previously presented). The identification of Claim 42 wherein said empirical information further comprises the tolerable error of said analysis.

Claim 44 (previously presented). The identification of claim 42 wherein said composition is a substance manufactured in an industry chosen from the group of industries consisting of the chemical, petroleum, pharmaceutical, biomedical, biochemical, environmental, paint, explosive material and combustible fuel industries.

Claim 45 (previously presented). A method of providing an objective identification of a batched product comprising the steps of analyzing a plurality of naturally occurring stable isotopes of said batched product, deriving empirical information from said analyzing step, and arranging said empirical information into a numerical array.

Claim 46 (previously presented). The method of Claim 45 wherein said analyzing step comprises determining ratios of measured concentrations of two or more stable isotopes of said batched product.

Claim 47 (previously presented). A method of tracing an unknown composition to a known composition comprising the steps of performing the method of Claim 46 for a plurality of known compositions, indexing said numerical arrays for said known compositions in a readable form into an index linking said numerical arrays to product information for a plurality of known compositions, performing the method of Claim 46 for said unknown composition, comparing said numerical array for said unknown composition to said numerical arrays of said index, determining

whether said numerical array for said unknown composition matches any of the numerical arrays contained in said index, and matching said numerical array of said unknown composition to the numerical array of a known composition in said index thereby identifying said unknown composition or distinguishing said unknown composition from said known compositions of said index.

Claim 48 (currently amended). The ~~method~~ identification of Claim 5 wherein said isotopes are any of the plurality of naturally occurring stable isotopes of said composition.

Claim 49 (previously presented). The method of Claim 17 further comprising the step of increasing the composition of at least one of the plurality of naturally occurring stable isotopes of said composition, and analyzing the same as part of said analyzing step.

Claim 50 (previously presented). A method for identifying a composition comprising identifying a plurality of the naturally occurring stable isotopes of said composition, analyzing said composition for the concentrations of a plurality of naturally occurring stable isotopes of said composition, deriving empirical information from said analyzing step, arranging said empirical information into a numerical array and formulating said numerical array into a readable form.

Claim 51 (previously presented). The identification of Claim 1 wherein said readable form is comparable to numerical arrays of isotopic concentration from the analyses of said naturally occurring stable isotopes of unknown batched products, whereby unknown products can be identified with and differentiated from said known products.

Claim 52 (previously presented). The identification of Claim 1 wherein said readable form is indexed to stored product information, whereby products can be securely traced through

manufacturing and the marketplace and distinguished from said unknown products.

Claim 53 (previously presented). The method of Claim 17 wherein said readable form is chosen from the group of readable forms consisting of serial numbers, bar codes, and other numerical and alphabetical indicia.

Claim 54 (previously presented). The method of Claim 17 wherein the isotopes available are any of the 224 existing stable isotopes of known elements that have two or more isotopes.

Claim 55 (previously presented). The isotopic identification of Claim 42 wherein said empirical information is chosen from the group of empirical information consisting of concentrations of isotopes, concentrations of isotopes and their errors, ratios of isotope concentrations, ratios of isotope concentrations and their errors and combinations thereof.

Claim 56 (previously presented). The isotopic identification of Claim 42 wherein said readable form is chosen from the group of readable forms consisting of serial numbers, bar codes, and other numerical and alphabetical indicia.

Claim 57 (previously presented). The isotopic identification of Claim 42 wherein said mathematical array is chosen from the group of mathematical arrays consisting of a list of a plurality of concentrations, a list of a plurality of isotopic ratios, a list of a plurality of mathematical products of isotopic concentrations, a list of a plurality of mathematical products of isotopic ratios, groups of any such lists, groups of any such mathematical products, groups of any such ratios, groups of any such concentrations, mathematical products of any such concentrations plus or minus their error added, mathematical products of any such ratios plus or minus their error added, any such concentrations, ratios, lists, groups, and mathematical products in quadrature,

isotopic ratios of any such mathematical products, ratios of said concentrations plus or minus their errors added, any of such concentrations plus or minus their errors added, factor analysis of any such concentrations, ratios, lists, groups, mathematical products and any determinants and combinations thereof.

Claim 58 (previously presented). The isotopic identification of Claim 42 wherein said isotopes are any of the 224 existing stable isotopes of known elements that have two or more isotopes.

Claim 59 (previously presented). The isotopic identification of Claim 42 wherein said isotopes are of any of the 13 stable isotopes of the group of elements consisting of carbon, hydrogen, oxygen, nitrogen, sulfur and combinations thereof.

Claim 60 (previously presented). The isotopic identification of Claim 43 wherein the error of the identification is chosen by the mathematical array chosen, the number of concentrations of isotopes utilized in said array, and the portion of said array compared with the isotopic analysis of said unknown product.

Claim 61 (previously presented). The isotopic identification of Claim 42 wherein the composition from which the concentrations of isotopes are analyzed and formed into a mathematical array is chosen from the group of batched products consisting of active pharmaceutical ingredients, excipients of drug products, impurities in drug products, raw materials, combustible fuels, additives to combustible fuels, environmental and naturally occurring products, explosives products, ammunition, gun powder, crude oil, petroleum distillates, hazardous waste, paper, ink, tire materials, paints and other coatings, and other synthetic materials.

Claim 62 (previously presented). The isotopic identification of Claim 55 wherein said concentrations of isotopes are chosen from the group of concentrations of isotopes consisting of bulk phase analysis and specific compound analysis.

Claim 63 (previously presented). The isotopic identification of Claim 62 wherein said bulk phase analysis includes off-line dual inlet isotope ratio mass spectrometry (irMS) and on-line combustion coupled with high resolution isotope ratio monitoring/mass spectrometry (irmMS).

Claim 64 (previously presented). The isotopic identification of Claim 62 wherein specific compound analysis includes gas chromatography coupled with irMS (irmGCMS) and liquid chromatography coupled with irMS (irmLCMS).

Claim 65 (previously presented). The isotopic identification of Claim 42 wherein said analyses includes nuclear magnetic resonance.

Claim 66 (previously presented). The isotopic identification of Claim 42 wherein said readable form is a machine readable form that is comparable to other machine readable forms derived from the analysis of known products and their product information stored in memory on a machine together with an index, said machine readable forms, index, and product information being interlinked, said machine readable forms once identified through the index presents stored product information in displayed form.

Claim 67 (previously presented). The isotopic identification of Claim 66 wherein said product information may be scrolled through.

Claim 68 (previously presented). The isotopic identification of Claim 66 wherein said product information may be printed.

Claim 69 (previously presented). The isotopic identification of Claim 66 wherein said product information may be accessed through said index from said machine readable form of said mathematical array.

Claim 70 (previously presented). A method of providing an objective identification of a batched product comprising the steps of analyzing a batched product for the concentration of a plurality of the naturally occurring stable isotopes of said batched product, arranging said concentrations of said isotopes into a mathematical array, formulating said mathematical array into a readable form, assembling product information with regard to said batched product, indexing said product information and said readable form to a description of said product thereby forming an index, and maintaining said index and said product information and said readable form.

Claim 71 (previously presented). An identification for a batched product comprising an arrangement of empirical information derived from an analysis of a plurality of naturally occurring stable isotopes of said batched product, said arrangement comprising a numerical array of said empirical information in readable form.

Claim 72 (previously presented). An identification for a batched product comprising an empirical information derived from an analysis of a plurality of naturally occurring stable isotopes of said batched product, said empirical information being arranged in a numerical array, said array being a readable form, said readable form being comparable to the empirical information of said naturally occurring isotopes of unknown products, said readable form being indexed to stored product information, whereby unknown products can be identified with and differentiated from said known products.

Claim 73 (previously presented). A method of linking an unknown composition to known compositions comprising the steps of analyzing a plurality of stable naturally occurring isotopes of a plurality of known compositions, deriving empirical information from said analyzing step of said known compositions, arranging said empirical information from said known compositions into numerical arrays, placing said numerical arrays and product of said known compositions into an index, analyzing a plurality of stable naturally occurring isotopes of an unknown composition, deriving empirical information from said analyzing step performed on said unknown composition, arranging said empirical information from said unknown composition into a numerical array, comparing said numerical array of said unknown composition to said numerical arrays of said index, determining whether said numerical array of said unknown composition matches any of the numerical arrays of said index.

Claim 74 (previously presented). A method of comparing batched products comprising the steps of analyzing a first plurality of stable naturally occurring isotopes of a second plurality of elements of a third plurality of batched products thereby generating a fourth plurality of isotopic data, said fourth plurality of isotopic data being for each of said third plurality of batched products, respectively, listing said fourth plurality of isotopic data, listing identifications of said third plurality of batched products from which each of said fourth plurality of isotopic data were derived, linking said identifications with said isotopic data thereby forming an index, analyzing a fifth plurality of stable naturally occurring isotopes of a sixth plurality of elements of an unknown batched product thereby generating a seventh plurality of isotopic data, comparing said seventh plurality of isotopic data with said fourth plurality of isotopic data to identify said

unknown product as one of said third plurality of batched products or to distinguish said unknown product from said third plurality of batched products, said fifth, sixth, and seventh plurality being less or equal in number to said first, second, fourth plurality, respectively, and determining the precision of said comparing step by selecting said fifth plurality of stable naturally occurring isotopes of said unknown product.

Claim 75 (previously presented). The method of Claim 74 wherein said analyzing said first plurality and fifth plurality include analyses chosen from the group of analyses consisting of bulk phase analyses including offline dual inlet isotope radio mass spectrometry (IRMS) and online combustion coupled with high resolution isotope ratio monitoring/mass spectrometry (IRMS), NMR, and specific compound analyses including gas chromotagraphy coupled with IRMS (IRMGCMS) and liquid chromotagraphy coupled with IRMS (IRMLCMS).

Claim 76 (previously presented). The method of Claim 74 wherein said stable naturally occurring isotopes include any of the 224 existing stable isotopes of known elements that have two or more isotopes.

Claim 77 (previously presented). The method of Claim 74 wherein said stable naturally occurring isotopes are any of the 13 stable isotopes of the group of elements consisting of carbon, hydrogen, oxygen, nitrogen, sulfur and combinations thereof.

Claim 78 (previously presented). The method of Claim 74 wherein said fourth plurality of isotopic data are arranged in a plurality of mathematical arrays being presented in a readable form.

Claim 79 (previously presented). The method of Claim 78 wherein said readable form

is chosen from the group of readable forms consisting of serial numbers, bar codes and other numerical and alphabetical indicia.

Claim 80 (previously presented). The method of Claim 78 wherein said fourth plurality listing step results in a list of machine readable arrays.

Claim 81 (previously presented). The method of Claim 74 wherein said identification listing results in a list of physical properties of said third plurality of batched products.

Claim 82 (previously presented). The method of Claim 74 wherein said identification listing results in a list of chemical properties of said third plurality of batched products.

Claim 83 (previously presented). The method of Claim 74 wherein said unknown batched product is a sample of a product larger in volume of said sample, and said sampling of said larger in volume products is more precise than the precision of said comparing step.

Claim 84 (previously presented). The method of Claim 74 wherein said analyses of said analyzing steps each have a dynamic range equal to the observed range divided by the 1-sigma standard deviation.

Claim 85 (previously presented). The method of Claim 84 wherein the precision of each of said analyses is the 1-sigma standard deviation of the analysis performed divided by the square root of the number of observations of said analysis.

Claim 86 (previously presented). The method of Claim 74 wherein the specificity of said comparing step using analyses of C^{13}, N^{15}, O^{18} and H^3 is determined by the following equation:

$$\text{Specificity} = (1\sigma\text{-}\delta^{13}C/\Delta\delta^{13}C)*(1\sigma\text{-}\delta^{15}N/\Delta\delta^{15}N)*(1\sigma\text{-}\delta^{18}O/\Delta\delta^{18}O)*(1\sigma\text{-}\delta D/\Delta\delta D)$$

Claim 87 (previously presented). The method of Claim 74 wherein the specificity of said comparing step is inversely proportional to the product of the dynamic ranges of each isotopic analysis undertaken of said unknown batched product.

Claim 88 (previously presented). The method of Claim 74 wherein the precision of said comparing step is increased by compounding the precisions of said seventh plurality of isotopic data.

Claim 89 (previously presented). The method of Claim 74 wherein the predicted degree of specificity of said comparing step is inversely proportional to the product of the dynamic ranges for each isotopic analyses undertaken in analyzing said fifth plurality of stable naturally occurring isotopes of a sixth plurality of elements of said unknown product.

Claim 90 (previously presented). The method of Claim 84 wherein the dynamic range is the range of values expected for an analysis divided by the 1-sigma standard deviation of that analysis.